

BOOK REVIEW

Mitchell, Andrew W. with forward by Gerald Durrell, 1986. *The Enchanted Canopy: A Journey of Discovery to the Last Unexplored Frontier, the Roofs of the World's Rainforests*. Macmillan Publishing Company. New York. 225 pages, 99 colour photographs, one black and white photograph, one text figure, subject index. Price \$29.95. U.S.A.

A few months before my first trip to the tropical rainforests, I accepted with great pleasure a chance to review a book on the subject of rainforest canopies, the inside front cover of which began: "you are about to enter the earth's last uncharted frontier", hopefully referring to rainforests and not the book itself. Opening the cover, I found an incredible collection of superb colour photographs, many of them entomological, but portraying among them all conceivable facets of the rainforest environment. I flipped through the pictures numerous times (and wondered if the picture at the top of page 99 was in sideways) before settling down to the text, prefaced by a brief, if uninspired, forward by Gerald Durrell.

Andrew Mitchell is an adventurer, naturalist, and television and film producer, and his book is a semi-popular treatment of life, both human and otherwise, in the world's rainforests. It is not scientific, but it does claim to represent the cutting edge of rainforest knowledge, and is therefore worthy of close scrutiny. The preface includes a vivid description of daybreak in the Bornean forest canopy, and the first chapter then presents a summary of the location and status of the world's rainforests. The tone is set, with emphasis on conservation, primates, and caving ropes. Apparently, the best way to reach the canopy is *via* ropes of the same sort used by spelunkers when lowering themselves into caves. In a harness which can be moved up and down on a main rope, biologists can suspend themselves at any level of the canopy, dangling with both arms free to take pictures, notes, or specimens. This is indeed interesting, but by the end of the book the wonders of caving ropes have been repeated *ad nauseam*, along with accounts of construction of walkways in the canopy. The second chapter is concerned with animal locomotion in the canopy. It begins with an odd argument that nightmares involving a fall from a great height, a common theme for most of us, might represent a sort of racial memory from our arboreal ancestry: one of Mitchell's erroneous views of human nature and evolution, which in my opinion form the intellectual core of this book. A discussion follows of the use of regular routes through the canopy by branch-running mammals, which reminded me of the routes taken in aspen forests around Edmonton by red squirrels. Throughout the text, naturalist readers will be reminded of temperate examples of many of the supposedly unique features of the rainforest canopy. A few inaccuracies also surface in this chapter, notably near the middle of page 44 where one gets the impression that lorises are not primates.

The third chapter, entitled "The Hanging Gardens", deals with epiphytic plants and their associated fauna, and is highlighted by a fascinating discussion of arboreal roots. It is more interesting than the preceding two chapters, perhaps on account of its dramatic, law-of-the-jungle theme. The next chapter, "A Place to Live", continues the theme of dramatic competition among the forest creatures. The most entomologically interesting part of this chapter is a discussion of passion flower vines and their defences against egg-laying by heliconiid butterflies. Chapter five, "Tree-top Voices", points out the difficulty of communicating in the dense growth of the canopy, and surveys the diversity of animal calls which have evolved to use the "sound window" between 125-600 Hz, in which calls can penetrate the forest to maximum advantage. A lengthy discussion of primate calls leads to a brief discussion of orangutan sexuality, in which Mitchell uncritically cites reports of male

orangutans raping human women, and being brought to "tribal long-house parties to indulge in some bizarre activities, so much so that there was for a time a fear that venereal disease might enter the wild population." Primatologists I questioned on this topic found it as difficult to believe as I did, although orangutans are apparently the only non-human primates which engage in forced copulation. Similar sexual prowess was once mistakenly attributed to male gorillas (for an historical summary, see "Man and Apes" by Ramona and Desmond Morris, 1966, Hutchinson and Co., Ltd., London, pp. 54-83) and this belief may tell us more about our perceptions of apes than it does about great ape behaviour. This point aside, the fifth chapter is well-focussed and interesting, a welcome change for the better. "The Flowering of the Forest", the sixth chapter, begins by outlining some of the puzzles surrounding the study of canopy flowers. How do conspecifics achieve cross-pollination, and some, synchronized blooming, when they are spread few and far between among other trees? Just as this story is picking up Mitchell launches into another advertisement for caving ropes, followed by scattered natural history notes having something or other to do with pollination. The next chapter, "Feasting in the Tree Crowns", emphasizes plant dispersal and seed success, not feeding by animals as the title suggests, and includes numerous fascinating accounts of adaptations of canopy plants and animals. It wanders a bit (for example into a discussion of nesting in hornbills), misidentifies the beetle figured on page 171 as a scarab (it is a chrysomelid), and anthropomorphically refers to "terrified" ants having their brains eaten away by parasites, "sending them mad".

By the time I reached Chapter Eight ("Killers in the Canopy") it was clear that Mitchell views nature as a dramatic stage upon which violent battles are fought; a typical approach for television nature programmes, and programmers. Nonetheless, I enjoyed the interesting survey of research on carrion feeding vultures and their keen sense of smell, allowing them to find carrion hidden beneath the canopy. The last two chapters deal with people and their relationship with the rainforest. The "Tree People" presents a survey of people who "have not altogether lost the art of climbing", and thus begins with an anthropological fallacy, bordering on racism. Uncritical references to the Tasaday tribe, which is now widely considered an anthropological hoax, further tarnish Mitchell's credibility. The entire chapter seems to reflect his perception of native people as noble savages, in harmony with their surroundings and in sharp contrast with the ignorance of Western culture. Anthropologists now recognize this belief as a prime example of Western ignorance. The book ends with a plea for conservation, in a chapter with two titles; one in the table of contents ("A Future Above the Tree Tops") and one in the text ("Above the Future Forest"), both of which sound a bit religious to me. Mitchell makes a provocative point when he suggests that promotion of nature reserves in third world countries is simply "a new form of colonialism", which is true in a strictly political and sociological sense, notwithstanding good biological reasons for such endeavours. The text then produces the only two typographic errors I could find ("scaffolding" on p. 236, and "Mavins" on p. 247), and a string of endorsements for "The Living Planet", David Attenborough ("the world's most famous naturalist"), Operation Raleigh, and a few other adventurous canopy projects, all of which involve "arboreal naturalists", fulfilling their "deeper felt mission". A complex metaphor summarizes our plight. Man is cutting off the branch he is sitting on in the great clock of the rainforest which tells us that time is up, and that we must fix the clock without knowing how it works.

Reading this book is like taking a guided hike through the rainforest canopy with a good naturalist. Along the way he points out curious plants and animals, and tells fascinating stories about them, making the hike much more informative than it would have been without him.

When we return to the starting point, we have picked up his contagious enthusiasm for the plight of this environment, and feel a strong need to do something about it. As a former interpretive naturalist myself, I admire his technique, but I also know how tempting it is to present an embellished, oversimplified version of biology in order to motivate the people on your hike. Popularization is not inherently bad, but it carries an intellectual responsibility, which Mitchell has not entirely heeded.

Why review such a book in the first place, you might ask? Certainly it is unfair for a practising biologist to pounce on a popular account as if it were a scientific treatise. On the contrary, I argue that popular science is more important than that. Those of us interested in evolutionary theory, and in the study of ecology know all too well that many of our colleagues have received most if not all of their training in these fields from their television sets, and the magazine rack. Well-educated, intelligent people will read this book, and will find little wrong with its outlook. It is extremely rare to see evolutionary theory portrayed accurately in science, let alone in the popular press. By understanding popular conceptions of ecology and evolution, we can identify sources of some of the misconceptions which arise in classrooms, biological journals, and politics.

Competition plays a strong role in Mitchell's book. Survival of the fittest, and the struggle for existence both imply the overriding importance of competition, and so evolution is seen by many people as nothing but competition. This makes for good stories. It also reinforces the idea that all life is struggling, presumably to become more advanced, which means more mammalian, or more human. In Chapter 4 we find that "amphibians suffer from the fact that their skins are permeable to water." Should we feel sorry for them, happily wrapped in our own water-tight epidermis? In the next chapter, we see that gibbons are on the right track, since they "have now chosen a family way of life." The Great Chain of Being still figures prominently in popular ideas.

Then, there is natural selection, which apparently requires sex and rainforests. One poor plant, mentioned on page 87, "is denied the genetic diversity that sex would bring, and seems to be locked into an evolutionary dead end." On page 218, we find the incredible statement that "without freedom of choice, natural selection is made sterile and evolution is brought to an end." By freedom of choice he means genetic diversity, but these concepts are not identical. Freedom of choice implies free will, or self determination. Natural selection is never prevented from choosing, it can only be restricted in the number of choices available at a given time. But "the heartland of natural selection", the rainforest, is being destroyed. What is natural selection, in Mitchell's view? On page 232, Mitchell reflects: "it is hard to believe that mere accident, moulded by a length of time beyond the imagination of our short-lived human minds, could realize such diversity." A creationist could have written that sentence, and creationists could quote it in support of their cause, if Mitchell were a more prominent evolutionist. Mis-quoting might not be necessary. Indeed, "it is hard to believe ..."

Evolutionary theory is not based on accident, it is based on selection and heritable variation. It is not based on sex, or there would be no parthenogenetic or asexual organisms. It is not based on rainforests, or there would be a wasteland outside my window in Edmonton right now. But how are non-biologists to know this, if it is the privileged knowledge of a scientific elite? The political battle between creationism and evolutionary thought no longer needs biology, since it is a popular concept of evolution which is under attack, and a lay public which defends it. I have criticised Mitchell's presentation of biology, but why should I assume that he is accountable to biologists? Perhaps this is no longer our concern, and perhaps we cannot change